

CECW-ET

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Manual  
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**Engineering and Design  
RESPONSE SPECTRA AND SEISMIC ANALYSIS  
FOR CONCRETE HYDRAULIC STRUCTURES**

**1. Purpose.** This manual describes the development and use of response spectra for the seismic analysis of concrete hydraulic structures. The manual provides guidance regarding how earthquake ground motions are characterized as design response spectra and how they are then used in the process of seismic structural analysis and design. The manual is intended to be an introduction to the seismic analysis of concrete hydraulic structures. More detailed seismic guidance on specific types of hydraulic structures will be covered in engineer manuals and technical letters on those structures.

**2. Applicability.** This manual applies to all USACE Commands having responsibilities for the design of civil works projects.

**3. Scope of Manual.** Chapter 1 provides an overview of the seismic assessment process for hydraulic structures and the responsibilities of the project team involved in the process, and also briefly summarizes the methodologies that are presented in Chapters 2 and 3. In Chapter 2, methodology for seismic analysis of hydraulic structures is discussed, including general concepts, design criteria, structural modeling, and analysis and interpretation of results. Chapter 3 describes methodology for developing the earthquake ground motion inputs for the seismic analysis of hydraulic structures. Emphasis is on developing response spectra of ground motions, but less detailed guidance is also provided for developing acceleration time-histories.

**4. Distribution Statement.** Approved for public release; distribution is unlimited.

FOR THE COMMANDER:

A handwritten signature in black ink, appearing to read 'Russell L. Fuhrman', with a stylized flourish at the end.

RUSSELL L. FUHRMAN  
Major General, USA  
Chief of Staff